REMARKS/ARGUMENTS

The amendment is in response to the Final Office Action dated August 23, 2005. Claims 1-15 are pending in the present application. Applicant has changed claims 1-3, 8, 9, and 14 with this amendment. Accordingly, claims 1-15 remain pending in the present application. No new matter or new issues have been presented.

The Examiner objected to claims 8 and 14 because of informalities, which have been corrected as set forth above.

The 112 Rejections

The Examiner rejected claims 1-15 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner stated that the new limitation is vague and indefinite, and appears to be a "double negative" which is confusing and misdescriptive. However, the claim language states that only the inactive channel is not directly coupled to the output, indicating that the active channel is directly coupled to the output, while the inactive channel is not directly coupled to the output, as disclosed throughout Applicant's specification; thus, the limitation is not a double negative. The Examiner also stated that there are coupling capacitances with the active channel that are also "not coupled directly" to the output, such as the coupling capacitance of BJT 5 in Fig. 2, which capacitances exist regardless of whether or not the channel is active. However, the BJT 5 is not included in an active or inactive channel of the multiplexer circuit.

To clarify the meaning of the claim as described above, Applicant has amended claims 1 and 9. These amendments simply clarify the existing claim limitations with meanings from

Applicant's specification, and thus new issues have not been introduced, and the claims do not require an additional search. For example, the coupling capacitance of a channel is the collector-base coupling capacitance of the differential pair of transistors, as is evident throughout Applicant's specification and drawings; the amendment merely clarifies this. Applicant therefore requests that these amendments be entered in the present application.

Amended claim 1 recites that first and second differential pairs of transistors of the first and second channels are coupled to the first and second inputs, respectively. This is shown in applicant's invention in Fig. 2, with the inputs IN1/IN1b and IN2/IN2b, coupled to the differential amplifiers 101 and 107, respectively. The claim also recites that the collector-base coupling capacitance of the differential pair of the active channel is coupled directly to the output, and the collector-base coupling capacitance of the differential pair of the inactive channel is not coupled directly to the output. These limitations are supported by the originally filed disclosure at page 4, lines 10-12 and 15-16 (describing the active channel coupled to the outputs) and lines 15-16 and 22-23 (describing the inactive channel not coupled to the outputs) and Fig. 2's transistors 102 and 104 and their collector-base capacitance Ccb (in the active channel when S is high, Sb is low) and transistors 114 and 116 and their collector-base capacitance Ccb (in the inactive channel when S is high, Sb is low). As described in the specification, the coupling capacitances of active-channel transistors 102-104 are directly coupled to the output when transistors 106 and 112 are turned on by select signal S; the coupling capacitances of inactive-channel transistors 114 and 116 are not coupled directly to the output because transistors 120 and 122 (which are also turned on by the S signal) are coupled to Vcc, not the output.

This recitation thus clarifies that the coupling capacitance of the active channel is coupled to the output, and the coupling capacitance of the inactive channel is not coupled to the output.

Furthermore, it is clarified that the recited coupling capacitance is the collector-base capacitance for the differential pair in the channel, e.g., as is clearly evident from the differential amplifier 101 and 107 in Fig. 2 and throughout the specification, and is not for other transistors such as BJT 5.

Claims 2 and 3 have been amended in accordance with the clarifying amendment to claim 1.

Claims 9, 10, and 11 have been amended to clarify the recited language in a similar way to claims 1, 2, and 3 as explained above.

Accordingly, Applicant respectfully requests that the rejection under 112, second paragraph, be withdrawn.

The Examiner rejected claims 1-15 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, stating that the newly added limitation is misdescriptive and/or not supported by the originally filed disclosure. As noted above, Applicant believes that the limitation is supported by the originally filed disclosure, and indicates that the inactive channel is not directly coupled to the output, but the active channel is directly coupled to the output. However, Applicant has clarified the claim language in claims 1 and 9 as explained above. The limitations are supported by the originally filed disclosure, as explained above, at page 4, lines 10-12 and 15-16 (describing the coupled active channel) and lines 15-16 and 22-23 (describing the non-coupled inactive channel) and Fig. 2, transistors 102 and 104 and their collector-base capacitance Ccb (for the active channel when S is high, Sb is low) and transistors 114 and 116 and their collector-base capacitance Ccb (for the inactive channel when S is high, Sb is low).

Accordingly, Applicant believes the claim limitations are descriptive and supported by the originally filed disclosure, and respectfully requests that the rejection under 112, first paragraph, be withdrawn.

The 102 Rejections

The Examiner rejected claims 1-15 under 35 U.S.C. §102(e) as being anticipated by Chang et al. (U.S. Patent No. 6,636,077) ("Chang"). Applicant respectfully traverses, and has amended claim 1 for clarification.

Applicant's claim 1 recites a multiplexer comprising a first input, a first differential pair of transistors of a first channel coupled to the first input, a second input, a second differential pair of transistors of a second channel coupled to the second input; and an output coupled to the first and second channels, where the first and second channels can be selected as active or inactive, and the collector-base coupling capacitance of the differential pair of the active channel is coupled directly to the output and the collector-base coupling capacitance of the differential pair of the inactive channel is not coupled directly to the output.

Chang does not disclose or suggest a multiplexer in which a coupling capacitance of the differential pair of the inactive channel is not coupled directly to the output. In Chang's circuit of Fig. 2, all the channels and their coupling capacitances are coupled directly to the output. For example, the channels Ch0 and Ch1 include the channel differential pair transistors 286-288, and 290-292, respectively, coupled to the inputs IN0 and IN1 (transistors 206-208 and 210-212 are buffer transistors), as described in col. 3, lines 39-54 of Chang. These channel transistors are always coupled directly to the outputs OUT and OUTB, whether or not the selection inputs C and S are selecting the channel of those transistors as active. Thus, the coupling capacitance of all

these transistors 286-288, 290-292, etc., is coupled directly to the output, whether they are inactive or active. Applicant's invention, in contrast, reduces crosstalk and jitter in a multiplexer by providing no direct coupling of collector-base capacitance of an inactive channel to an output, which Chang does not show. Applicant therefore believes that claim 1 is patentable over Chang.

Claims 2-8 are dependent on claim 1 and believed patentable over Chang for at least the same reasons as claim 1, and for additional reasons. For example, claims 2 and 3 recite that the differential pairs of transistors provide differential amplifiers (DAFs), and the channels further comprise a plurality of transistors coupled between the DAFs and the output. Chang does not disclose or suggest a plurality of transistors between amplifier and output; Chang's circuit couples the amplifiers (286-288, 290-292, etc.) directly to the output. The Examiner stated that BJTs 286 and 288, and 290 and 292, read on the "plurality of transistors"; however, BJTs 286-288 and 290-292 form Chang's differential amplifiers, and so cannot be the plurality of transistors of claims 2 and 3. Claim 8 recites that the first and second channels are activated and inactivated using at least one of the plurality of transistors coupled between amplifiers and output, and which is not disclosed or suggested by Chang.

Claim 9 recites a multiplexer comprising a first channel including a first input differential amplifier coupled to a first input and a first plurality of transistors coupled to the first input differential amplifier, a second channel including a second input differential amplifier coupled to a second input and a second plurality of transistors coupled to the second input differential amplifier, and an output coupled to the first and second plurality of transistors. A selection input provided to the first and second plurality of transistors connects either the first channel or the second channel as active for output and the other channel as inactive, such that a collector-base coupling capacitance of the active channel's differential amplifier is coupled directly to the output, and the coupling

capacitance of the inactive channel's differential amplifier is not coupled directly to the output. Similarly to the reasons explained above for claim 1, Chang does not disclose or suggest a selection input provided to the transistors that connects either the first or second channel as active, such that the coupling capacitance of the active channel's differential amplifier is coupled directly to the output, and the inactive channel's is not coupled directly. Claims 10-15 are dependent from claim 9, supported in Applicant's specification on page 4 and Fig. 2, and are patentable for at least the same reasons and for additional reasons. For example, claims 12-15 recite connections between the plurality of transistors, the differential amplifiers, and the output which are not disclosed or suggested by Chang.

Applicant therefore respectfully requests that the rejection of claims 1-15 in view of Chang be withdrawn.

The Examiner rejected claims 1-15 under 35 U.S.C. §102(b) as being anticipated by Minegishi (U.S. Patent No. 6,515,518). Applicant respectfully traverses. Minegishi discloses in Fig. 7 a circuit including differential amplifiers 1A-2A and 1B-2B, transistors 3A-6A and 3B-6B provided between the differential amplifiers and a stage of transistors 31-32, and an output 37-38 coupled to the stage 31-32. Minegishi does not disclose or suggest a multiplexer in which a collector-base coupling capacitance of the inactive channel is not coupled directly to the output, and a collector-base coupling capacitance of the active channel is coupled directly to the output, as recited in Applicant's claim 1. In Minegishi's circuit, either channel A or channel B is made active and the other channel inactive, via switches 15A and 15B (col. 5, lines 26-30). However, the differential transistors 1A-2A (in channel A) always receive the same isolation from the output 37-38, and the coupling capacitance of these transistors is always coupled to the output in

the same way, regardless of whether channel A is active or inactive. Similarly, the coupling capacitance of transistors 1B-2B is coupled to the output 37-38 always in the same way, whether the channel B is inactive or active. Minegishi thus does not disclose a circuit in which a coupling capacitance of the active channel's differential pair is coupled to the output, and the coupling capacitance of the inactive channel's differential pair is not coupled directly to the output, as recited in claim 1. Applicant therefore believes that claim 1 is patentable over Minegishi.

Claims 2-8 are dependent on claim 1 and believed patentable over Minegishi for at least the same reasons as claim 1, and for additional reasons.

Claim 9 is patentable over Minegishi for reasons similar to those explained above for claim 1. Claims 10-15 are dependent from claim 9 and are patentable for at least the same reasons and for additional reasons. For example, claims 12-15 recite connections between the plurality of transistors, the differential amplifiers, and the output which are not disclosed or suggested by Minegishi.

Applicant therefore respectfully requests that the rejection of claims 1-15 in view of Minegishi be withdrawn.

The Examiner rejected claims 1-6 under 35 U.S.C. §102(b) as being anticipated by Smetana (U.S. Patent No. 6,211,721). Applicant respectfully traverses. Smetana discloses in Fig. 2 a circuit including differential pair transistors Q1-Q2, Q3-Q4, etc., coupled to cascode transistors Q49 and Q50, which are coupled to output transistors Q51 and Q52 that are coupled to the outputs Q and QN. Smetana does not disclose or suggest a multiplexer in which a coupling capacitance of the differential pair of the active channel is coupled to the output, and the coupling capacitance of the differential pair of the inactive channel is not coupled directly to the

output, as recited in Applicant's claim 1. In Smetana's circuit, the coupling capacitance of all differential pair channels is coupled to the output always in the same way, whether those channels are inactive or active. Thus, the amplifier transistors Q1-Q2 receive the same isolation from the output Q and QN by the transistors Q49-Q51, whether Q1-Q2 are active or inactive, so that the coupling capacitance of differential pair transistors Q1-Q2 is always coupled to the output in the same configuration, regardless of whether the channel of those transistors is active or inactive. Similarly, the coupling capacitance of the other channels is always coupled to the output 37-38 in the same configuration, whether those channels are inactive or active. Smetana does not disclose a circuit in which a coupling capacitance of an active channel's pair is coupled directly to the output, and the coupling capacitance of an inactive channel's pair is not coupled directly to the output, as in Applicant's claim 1. Applicant therefore believes that claim 1 is patentable over Smetana.

Claims 2-8 are dependent on claim 1 and believed patentable over Smetana for at least the same reasons as claim 1, and for additional reasons. For example, Smetana does not disclose or suggest a first plurality of transistors between a first differential amplifier and output, and a second plurality of transistors between a second differential amplifier and output as recited in Applicant's claims 2 and 3; in Smetana, all the amplifiers are connected to the same set of transistors Q49-Q52. Claims 5 and 6 recite that the transistors provided between amplifiers and the output are turned off when particular channels are inactive; in contrast, Smetana discloses that his transistors Q49-Q51 are not turned off based on particular channel inactive status, since these same transistors Q49-51 are used for all the channels. Claim 8 recites that the first and second channels are activated and inactivated using at least one of the plurality of transistors

coupled between amplifiers and output, and which is not disclosed or suggested by Smetana, who does not disclose such a plurality of transistors.

Claim 9 is patentable over Smetana for reasons similar to those explained above for claim 1. Claims 10-15 are dependent from claim 9 and are patentable for at least the same reasons and for additional reasons. For example, claims 12-15 recite connections between the plurality of transistors, the differential amplifiers, and the output which are not disclosed or suggested by Smetana.

Applicant therefore respectfully requests that the rejection of claims 1-15 in view of Smetana be withdrawn.

Conclusion

In view of the foregoing, Applicants submit that claims 1-15 are allowable over the cited references. Applicants respectfully request reconsideration and allowance of the claims as now presented.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,
SAWYER LAW GROUP LLP

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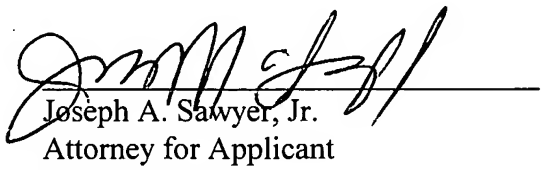
Date



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